

**A NOTE ON THE MIGRATION OF CERTAIN WATER-STRIDERS (HEMIPTERA).<sup>1</sup>**

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Near the Biological Laboratory at Cold Spring Harbor, Long Island, N. Y., there is a small roadside pond of clear, cold water, fed abundantly by springs and commonly called "the dying pond," because from year to year its area is being gradually encroached upon by a growth of plants advancing from the west margin. While collecting here recently with a class I noted that every water-strider taken and apparently every adult on the pond was fully winged, a state of affairs which throws an interesting side-light on the general problem of pterygopolymorphism in the several families concerned.

A number of students, since Reuter published his early work, have given some consideration to the remarkable fact that in many species of Hemiptera alate and apterous adults (and often intermediate phases) occur simultaneously in identical environments, though in relative frequencies varying in the different species and possibly with certain seasonal or other external factors. It has been explained that the presence of wings might offer some handicap to active life on the surface film, so that natural selection could account for the persistence of apterous forms, once they were produced by mutation; moreover, there can be no doubt that the production of wings is expensive for the organism, so that the elimination by apterism of this drain on vitality provides an even more certain advantage for selection to lay hold on, if wings are in truth of no great value under ordinary conditions of existence. However, fresh-water environments are seldom permanently favorable, and thus most of the Gerrids and their relatives have found it necessary to retain the wing-producing factor in their germplasms, insuring the appearance of forms capable of flight frequently enough to accomplish the requisite migrations.

"The dying pond," situated far from other bodies of water, has thus been populated by winged migrants, and ordinarily we would expect to find their apterous descendants, at least in those species

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which produce the wingless phase most abundantly; but, as noted above, such was not the case in this instance and the explanation is to be sought in the presence of an artificial complication. The pond is occasionally oiled to kill mosquito larvae, with the result that other water insects, including the water-striders, are also exterminated. The oil still remaining about the margins indicated that this operation must have been performed not long before the occasion of our collecting trip—just enough time having elapsed to permit the restocking of the pond by winged migrants and their reproduction, as shown by the presence of young nymphs of *Gerris* and *Rheumatobates*. Unfortunately, it will be impossible to ascertain the pterygotic condition of these  $F_1$  descendants, as an inspector stood by to give the pond a new covering of oil as soon as our collecting was finished.

The species which in an undoubtedly brief interval were able to repopulate the pond and which occurred only in the alate phase are as follows:

Family Gerridae: *Gerris remigis*, *G. marginatus*, *G. buenoi*,  
*Limnoporus rufoscutellatus*, *Rheumatobates rileyi*.

Family Veliidae: *Microvelia albonotata*.

Family Mesoveliidae: *Mesovelia mulsanti*.

Of the species enumerated some are very commonly or always winged—e.g., *L. rufoscutellatus*—but *G. remigis*, *R. rileyi*, *M. albonotata*, and (in less degree) *M. mulsanti* are rarely found in the alate phase. Of *R. rileyi*, indeed, which swarms in myriads on the surface of lakes less than a mile away, I have found in three years but a single winged specimen (a male) among thousands examined, and yet here, on “the dying pond,” were half a dozen. It is worthy of note that the males and females of *R. rileyi* which were present, with their young, exhibited the mutilated hemelytra, which, as de la Torre-Bueno has shown, are broken by the insects themselves to facilitate copulation.

This occasion thus affords a striking illustration of the dispersive value to pterygopolymorphic species of alate individuals, confirming speculation by an actual instance; and it further demonstrates the sufficiency of the arrangement even in species, like *R. rileyi*, which produce winged individuals only with the greatest infrequency.